

PROCEEDINGS OF LEARNED SOCIETIES.

BOTANICAL SOCIETY OF EDINBURGH.

Feb. 13, 1845.—Dr. Douglas Maclagan, President, in the Chair.

Dr. Herman Hoffmann, Giessen, was elected a Foreign Member of the Society.

Various donations to the Library and Museum were announced, and the following communications were read :—

1. Dr. Seller read a paper entitled “Examination of the Views adopted by Liebig on the Nutrition of Plants.”

He contrasted Liebig’s view of the mineral nature of the food of plants with that which represents their food as organic. He traced out the consequences deducible from this last hypothesis as affecting not merely the vegetable but the animal kingdom also, the latter being ultimately sustained solely by vegetable substances. He showed that, whereas the view adopted by Liebig nowise restricts the duration of the organized kingdoms, as long as they remain exempt from the influence of destructive agencies from without, the opposite view involves the conclusion, that the whole of organic nature is hastening rapidly to dissolution from inherent causes; and he affirmed, that were certain data somewhat more carefully considered, the period of the final extinction of plants and animals, in accordance with this hypothesis, might be pretty nearly determined. He regarded this question as one not merely of high interest in itself, but as bearing expressly on the solution of the problem, whether the food of plants be organic or mineral.

Dr. Seller calculates the annual conversion of the carbon of organic matter into inorganic carbonic acid at not less than 600 millions of tons; and infers, on the most favourable aspect of the amount of soil over the earth’s surface, that such an annual loss could not be withstood beyond 6000 years; and, on a less exaggerated assumption of its amount, probably very near the truth, that the waste would absorb the whole of the existing organic matter of the soil in about 740 years.

Dr. Seller contends that the truth of these conclusions remains unaltered, even if it be conceded that much of the carbon of plants is drawn, not from the organic matter of the soil but from the inorganic carbonic acid of the atmosphere, unless some inorganic source of their hydrogen and oxygen be at the same time admitted. He therefore regards Liebig’s view of the inorganic nature of the food of plants as supported not merely by many special facts—for example, by the increase of the organic matter of the soil, often observed during the growth of plants,—but also by the general view of the earth’s surface just taken, because there is nothing in its aspect to warrant the idea that its means of maintaining the organic kingdoms are declining with the rapidity indicated in the statements just made.

Dr. Seller next examined Liebig’s views of ammonia; 1st. as the sole source of the nitrogen of plants, and thereby of animals; 2nd,

as having its exclusive origin from the interior of the earth, and never from the nitrogen of the atmosphere. In regard to these statements he made it appear, as there is no evidence of ammonia being thrown forth from the bowels of the earth at all times in quantity proportioned to the waste of it necessarily sustained at the surface by decomposition, as into uncombined hydrogen and nitrogen, that Liebig's view of ammonia infers the same limitation of the existence of the organic kingdoms to a few thousand years, as is deduced from the hypothesis of organic matter being the food of plants. Here therefore he dissented from Liebig, contending that ammonia must be produced from the nitrogen of the atmosphere*, and showing the probability of what is taught by Professor Johnson, namely, that the nitrogen of nitrates, formed from the atmosphere, is fixed by plants, as well as the nitrogen of ammonia.

In conclusion, he reviewed the evidence of potassa, the phosphates and the other saline matters of both organic kingdoms being derived originally from the crumbling of rocks, and dwelt on the retardation of vegetable physiology by the long scepticism of botanists on this head, owing, as he believed, to their distrust in the conclusions of chemistry, and went on to show that chemistry must be the groundwork of vegetable physiology in its present stage, and that the frequent changes in the aspect and nomenclature of chemistry did not materially affect the facts which it daily affords for the elucidation of the vegetable economy.

2. A paper by Mr. Ralfs, of Penzance, on the genus *Closterium* was read. 'This paper will shortly appear in the 'Annals and Magazine of Natural History.'

3. Mr. M'Nab read a continuation of his Journal of a Tour through part of the United States and the Canadas. The last portion read before the Society gave an account of the journey from Montreal to Kingston, and concluded with an account of a botanical excursion to the eastward of the latter place:—

The woods to the westward of Kingston appeared very dense, chiefly consisting of stately beeches, growing in rich vegetable soil. Several very remarkable plants were observed, and among others the *Monotropa uniflora* and *M. Hypopitys*: the former, which is abundant in shady beech woods throughout the country, and always growing from amongst leaves, is known to the inhabitants by the name of Indian pipe or bird's-nest; the latter is not so plentiful, but found in similar situations. Here also *Corallorhiza multiflora* and *Orobanché virginica* were found, and at one place in a dense thicket the rare and curious *Pterospora Andromeda*.

Near the confines of the woods in drier situations the white and pink varieties of *Phryma leptostachya* occurred; and on the dry limestone ridges, which prevail in this neighbourhood, large quantities of *Triosteum perfoliatum*, *Gnaphalium margaritaceum*, and *Botrychium obliquum* were found; along the margin of Lake Ontario *Serpicola verticillata* was noticed, its delicate flowers floating on the surface.

* This has been clearly proved by the experiments of Prof. Mulder: see 'Chemical Gazette' for Jan. 1, 1845.—W. F.

The beech, sugar, maple and white pine, from their quantity and local situation, seem to have been the original inhabitants of this district; and mixed with them, but not so much in groups, were noble specimens of the oak, elm and walnut. The sugar-maples bore evident marks of having been often pierced for their juices. Fringing the edges of some meadow-land in this district, the stag's-horn sumach, *Rhus elegans*, presented a most magnificent appearance from the quantity of scarlet fruit.

He was agreeably surprised to see such a variety of native haw-thorns, being convinced of their fitness for forming hedges, so very much wanted in that country, and for which many of the inhabitants expressed a great desire, instead of the unsightly snake fences which at present separate the fields. Apparently they never thought that the indigenous thorns would answer for this purpose, as they talked of importing haws and white-thorns from Britain. Mr. M'Nab gave instructions to those individuals with whom he had an opportunity of conversing upon the subject, so that they may raise thorns for themselves, as an abundant supply of seeds may be annually procured at no great distance from each settlement. As these instructions may be interesting to others, we here repeat them:—

“The fruit should be gathered about the end of October, care being taken to keep the seeds of the luxuriant growing sorts separate from those of the dwarfer kinds. A pit should be prepared about a foot and a half deep, into which the fruit is to be put with a mixture of earth or sand. It should be turned several times during the season, and if dry, a little water may be added; one or two inches of soil being a sufficient covering to ensure the decomposition of the pulp. During the following October a piece of good ground should be prepared, and the seed sown as it is taken from the pit, pretty thickly, in drills about a foot distant from each other, or in beds 3 feet wide. In the succeeding spring the plants will begin to appear; at which time, and throughout the season, they must be kept clear of weeds. If properly attended to, the seedlings will attain a height of from 6 to 12 inches the first year. The following spring the strongest plants may be either transplanted into drills, or placed where they are intended to remain as a permanent fence. The smaller ones should be left in the seed drills or beds for another year, when they may be treated in the same manner. In forming a live fence, the ground ought to be prepared as soon as the snow disappears, by making a trench about 2 feet broad and a spade in depth. Along the centre of this trench the young plants should be put about 6 or 8 inches apart, and afterwards well-watered and firmly trodden in. Care should be taken to protect the young plants from cattle and clear of weeds.

“The second year after planting, the thorns should be headed down to within six or ten inches of the ground, and each year afterwards switched up on both sides to a centre ridge, so as to produce the shape generally termed sow-backed; hedges trained in this form being less liable to be destroyed by snow resting upon them than when cut flat at the top.”

If the method here recommended be properly attended to, Mr. M'Nab has not the least hesitation in saying that an excellent hedge of native thorns may be acquired in five or six years after planting. At several places he saw the indigenous thorns employed as a fence; at least they had been planted with that intention, and had attained a considerable height, but from want of proper attention to pruning and weeding, they were so slender that easy access might be obtained between each stem. From such instances of mismanagement, an erroneous opinion seems generally to prevail that hedges will not succeed in America. "But," he very properly remarked, "if newly-planted hedges in Britain were equally neglected, there can be no doubt that they would soon degenerate, and become no better than those which I observed in the United States and the Canadas."

March 13.—Dr. Seller, V.P., in the Chair.

Robert Balloch, Esq., Glasgow, was elected a Non-resident Fellow of the Society.

Numerous donations to the Library and Museum were announced, particularly from R. J. Shuttleworth, Esq., Berne, a collection of North American plants, and the 14th Fasciculus of Meisner's *Plantarum Vasculorum Genera*; from the Imperial Academy, *Naturæ Curiosorum* of Breslau, the Supplement to vol. xix., and parts 1st and 2nd of vol. xx. of the 'Nova Acta'; from Professor Graham, plants collected in Jamaica by Dr. G. M'Nab; from H. C. Watson, Esq., his Botany of the Azores; from Mr. William Gardiner, jun., Dundee, Botanical Rambles in Braemar, &c. Dr. Parnell presented a copy of his beautiful work on the Grasses of Britain. The thanks of the Society were voted to the respective donors.

The following communications were read:—

1. "On the genus *Closterium* (continued)," by Mr. J. Ralfs, of Penzance.

2. "On *Encyonema prostratum* of Kützing," by the same. These papers will appear in the 'Annals of Natural History.'

3. Mr. M'Nab read a continuation of his Journal of a Tour through part of the United States and Canada. The last portion of this journal read before the Society chiefly related to the botanical aspect of the country immediately to the westward of Kingston; the indigenous thorns and their fitness for forming hedges being particularly described. From Kingston the party crossed Lake Ontario to Rochester, situated on the American side, a few miles above the mouth of the Genessee river. Considerable tracts of shallow water extend for some distance on either side of this river, in which the wild rice grew more luxuriantly than had been hitherto observed. Proceeding upwards the river becomes narrower but deep, having beautiful banks rising about 150 feet on either side, wooded chiefly with oak, elm, hiccory, beech, and birch, interspersed with hemlock spruce, white pine and arbor vitæ of large size. On the north bank the black snake-root, *Actæa ramosa*, was abundant, its long spikes of white flowers having a singular effect beneath the shade of the trees. It

was not seen on the south bank, but in its place considerable quantities of *Gerardia flava* and *G. quercifolia* were noticed, all richly clothed with flowers : here also several extensive groups of buckthorn, *Hippophaë canadensis*, were observed ; each plant formed a large silvery-looking bush, and when backed by the dark evergreen trees gave a picturesque effect to the landscape.

Crossing Lake Ontario again to Toronto, on the Canada side, a great difference in the vegetation was remarked ; here, for the first time in Canada, healthy specimens of weeping willows, locust-trees, and Canadian and Lombardy poplars were met with ; and for the first time in the country, a native forest of *Pinus resinosa*. The trees composing this forest were very tall, but none of the stems which were measured exceeded 2 feet in diameter. Many detached specimens of the black birch or mountain mahogany, *Betula lenta*, were also seen. It is described by Mr. M'Nab as a finely-shaped tree with a wide-spreading top, much resembling the beech-trees of Britain ; the stems averaged about 2 feet in diameter. Here also *Monarda fistulosa* and *Spiranthes tortilis* were found ; the latter very sparingly and for the first time.

They next directed their attention to the Peninsula of Toronto, lying about $2\frac{1}{2}$ miles from the city, across an arm of the lake. The soil is poor and sandy, interspersed with marshes. Several species of trees of dwarfish growth were scattered about, the most remarkable being the rose or conegall willow, *Salix conifera*, of which many fine specimens were observed, the branches generally terminating in silvery, cone-like excrescences, supposed to be occasioned by insects ; these, combined with the silvery whiteness of the foliage, gave the plants a remarkable appearance. Several other species of willows were noticed on the sandy plains, but none of them appeared to be infested with insects, although the appearance here described is not peculiar to the above species. The *Arbutus uva-ursi* covered considerable tracts : the Canadian plant is larger than the British, and even differs slightly from that found in the United States ; it is called by the Indians *Sacacomis* ; they smoke the leaves, and believe them to possess excellent medicinal properties. Few herbaceous plants were in bloom, with the exception of *Rudbeckia hirta*, which was in great abundance, although described by American authors as an inhabitant of the Southern States ; and *Dracocephalum virginianum*, which is by no means an abundant plant in Canada, Niagara Falls being the station given in botanical books ; but Mr. M'Nab failed to find it there ; it principally inhabits the mountain meadows of Virginia and Carolina ; *Linum virginianum*, *Cyperus flavescens* and *C. castaneus* ; *Silene Antirrhina*, *Scutellaria parvula* and *Lathyrus palustris* ; on dry loose sand, by the edge of the lake, *Euphorbia polygonifolia* was abundant, while in marshy places *Lobelia Kalmii* formed the greatest part of the vegetation, and was profusely covered with its rich blue flowers.

Specimens of the most remarkable plants were exhibited to the meeting.